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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/748,903	12/30/2003	Myoung-Ho Jung	8836-221 (IE13077-US)	7410

22150 7590 05/01/2007  
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EXAMINER
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WEBB, GREGORY E

ART UNIT	PAPER NUMBER
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1751

MAIL DATE	DELIVERY MODE
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05/01/2007

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

## Office Action Summary

Application No.

10/748,903

Applicant(s)

JUNG ET AL.

Examiner

Gregory E. Webb

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☐ Responsive to communication(s) filed on 09 March 2007.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-9 and 27-30 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-9, 27-30 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

  
4/27/07

## DETAILED ACTION

### *Claim Objections*

1. Claims 7 remains objected to because of the following informalities:
2. The applicant uses the verb "phosphorate" to describe a chemical compound. As the term "phosphorate" is a verb it is indicating a process and not a chemical compound. Thus it remains unclear to the examiner what specific compound is created by the phosphorating process. Does the process create a phosphonate or a phosphate? What is the valence of the phosphorous group? It remains unclear. The applicant has failed in their response to address the examiner's interpretation of the claim. Is the examiner's interpretation correct? The applicant merely states that the term is known. The applicant does not addresses the issues raised by the examiner. Such a response does not further prosecution as the examiner has already provided a definition of the term.
3. The examiner maintains that a verb is inappropriately used to describe the compound as the phosphorating process could produce numerous different compounds including phosphates and phosphonates. Appropriate correction is required.
4. Upon the applicant's suggestion the examiner did a tertiary search of the term "phosphorate" used in previous patents. The term "phosphorate" was used in claims only 41 times. Whereas the well-known term "phosphonate" was used over 4700 times. A review of these claims does not provide insight into structure of the compound.
5. The examiner has requested on several occasions that the applicant provide a definition. The examiner has provided his own definition based on a chemical dictionary

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which is contrary to the use found in applicant's claims. The examiner has performed a tertiary review of the prior art which did not provide a definition of the term. As such the examiner maintains that the term "phosphorate" is used improperly in the claim.

***Claim Rejections - 35 USC § 112***

1. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

2. Claim 7 and 29 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

3. The claims are generally narrative and indefinite, failing to conform with current U.S. practice. They appear to be a literal translation into English from a foreign document and are replete with grammatical and idiomatic errors.

4. In particular the applicant uses the term "phosphorate" in claim 7 to define a functional group. The examiner is not aware of any functional groups with this name. In fact the only definition available to the examiner teaches phosphorate as a process and not a functional group. As such the examiner is unclear as to the meaning of the phrase "ammonium perfluoroalkylethoxy phosphorate."

5. Claim 7 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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6. The applicant's claim 1 requires the compound to have a propoxy functionality. However, claim 7 recites a compound without any propoxy functionality. Therefore claim 7 does not conform to the required limitations of claim 1.

7. Claim 29 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. The applicant describes a compositions comprising water and a surfactant. At the end of the claim the applicant uses the phrase "and ammonium perfluoroalkylethoxy phosphate."

9. It is not clear if this term further defines the surfactant, n+q, or is a compound required in the composition. It is unclear because the applicant uses the term "and" after "deionized water" and again uses the term "and" after the definition of n+q. It is not clear to the examiner why this phrase was inserted and in particular why it was inserted in a position where it is dangling from the end of a claim.

10. The following is a quotation of the first paragraph of 35 U.S.C. 112:

The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

11. Claims 1-9, and 27-28 are rejected under 35 U.S.C. 112, first paragraph, as based on a disclosure which is not enabling. The propoxy functionality is critical or essential to the practice of the invention, but not included in the claim(s) is not enabled by the disclosure. See *In re Mayhew*, 527 F.2d 1229, 188 USPQ 356 (CCPA 1976).

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12. The applicant's claims now require that the surfactant contain at least one propoxy unit by the amendment to instant claim 1 requiring that  $n+q$  would be at least one. Such limitations were not presented in either the original claims or the original specification. Furthermore such amendments contradict claims that depend from claim 1. For example the formula of claim 7 contains only ethoxy functionality and lacks the required propoxy unit. As such these compounds fail to meet the required limitations of claim 1.

### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

(e) the invention was described in a patent granted on an application for patent by another filed in the United States before the invention thereof by the applicant for patent, or on an international application by another who has fulfilled the requirements of paragraphs (1), (2), and (4) of section 371(c) of this title before the invention thereof by the applicant for patent.

The changes made to 35 U.S.C. 102(e) by the American Inventors Protection Act of 1999 (AIPA) and the Intellectual Property and High Technology Technical Amendments Act of 2002 do not apply when the reference is a U.S. patent resulting directly or indirectly from an international application filed before November 29, 2000.

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Therefore, the prior art date of the reference is determined under 35 U.S.C. 102(e) prior to the amendment by the AIPA (pre-AIPA 35 U.S.C. 102(e)).

Claims 1-9, 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Messick, Scott A. (US20020115022).

Concerning the deionized water, surfactant and the ammonium perfluoroalkylethoxy phosphonate, Messick, Scott A. teaches the following:

[0065] A semiconductor wafer was coated with a KRS positive resist by spin coating using a puddling procedure. The resist coated wafer was exposed to provide line and space widths of about 100 nm with an aspect ratio of about 6. The exposed wafer was developed by puddling a **deionized water** solution of 0.263 N TMAH and 1% by weight **FC-93** (25% active) on the wafer surface while the wafer was at rest. **FC-93** is an ammonium perfluoroalkyl sulfonate **surfactant** sold by 3M Chemicals. After developing and while the wafer was still wet, the still wet wafer was rinsed with a rinse composition containing **deionized water** and **FC-93** anionic **surfactant** at a level of 1 weight %. The rinse composition was applied to the wafer at rest and the wafer was rinsed by spinning and then air dried. The results show that the resist pattern did not collapse and was satisfactory from a commercial standpoint. A control sample (no **surfactant** added to developer and rinse) collapsed at an aspect ratio of 3.5. (*emphasis added*)

Concerning the surfactant containing fluorine, Messick, Scott A. teaches the following:

[0066] The above example was repeated using **FC-143** which is an anionic surfactant comprising an **ammonium perfluoroalkyl carboxylate** surfactant and is also sold by 3M Chemicals. The developed resist pattern did not collapse and was commercially acceptable. (*emphasis added*)

Concerning the photoresist cleaning, Messick, Scott A. teaches the following:

1. A method for developing a **photoresist** pattern on an electronic component substrate for avoiding collapse of the developed pattern comprising the steps of: coating a **photoresist** film on an electronic component substrate; exposing the **photoresist** film to a predetermined pattern; supplying a developer composition to the exposed **photoresist** film to develop the **photoresist** pattern, the developer composition containing an anionic surfactant in a sufficient amount to avoid collapse of the pattern; developing the **photoresist** film to form the predetermined **photoresist** pattern and maintaining the substrate wet; supplying a rinse water solution on the wet developed substrate, the rinse water solution

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comprising deionized water and an anionic surfactant in an amount sufficient to avoid collapse of the pattern; rinsing the developed substrate; and drying the developed substrate to form an electronic component substrate having a predetermined **photoresist** pattern thereon. (*emphasis added*)

Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(b) as being anticipated by Hopkins, Ronald J. (US4517106).

Concerning the surfactant, Hopkins, Ronald J. teaches the following:

1. An etching solution containing a **surfactant** which is stable against precipitation of the **surfactant** comprising an aqueous mixture of ammonium fluoride and **surfactant** that contains between 13.5 and 45 weight percent ammonium fluoride (NH<sub>4</sub>F) and between 25 and 20,000 ppm of a fluoroalkylsulfonate **surfactant** of the formula (*emphasis added*)

Concerning the surfactant containing fluorine, Hopkins, Ronald J. teaches the following:

TABLE 1

Examples	Surface Tension Before Filtration		Surface Tension After Filtration	
	Dynes/cm	Dynes/cm		
(1) LI No. 2.sup.(a)		24.2	26.0	
(2) LI No. 1.sup.(b)		33.8	53.5	
(3) C.sub.3 H.sub.7 SO.sub.3 H.sup.(c)			67.2	67.7
(4) None*	89	89		
(5) C.sub.8 F.sub.17 SO.sub.3 K*			21.6	72.7
(6) Zonyl FSH.sup.(d) *		25.2	76.7	
(7) Triton X-100.sup.(e) *		39.3	70.8	

\*(comparative)

.sup.(a) perfluoroalkyl sulfonate with alkyl groups of 4-7 carbon atoms.

.sup.(b) fluorinated amphoteric surfactant (linear perfluoro alkyl

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sulfonate of 3-6 carbon atoms).

.sup.(c) solubility of C.sub.3 H.sub.7 SO.sub.3 H was high but activity was low and substantial reduction of surface tension occurred even at 3% by weight addition. Higher alkyl sulfonates up to C10 may also be employed.

.sup.(d) R.sub.f CH.sub.2 CH.sub.2 O(CH.sub.2 CH.sub.2 O).sub.x 4 where R.sub.f is F(CF.sub.2 CF.sub.2)3-9 and x is 6-20

.sup.(e) C.sub.8 H.sub.17 --C.sub.6 H.sub.4 --(OCH.sub.2 CH.sub.2).sub.6-12 OH

.sup.(f) ammonium perfluoro alkyl sulfonate of 8-10 carbon atoms. (*emphasis added*)

Concerning the ammonium perfluoroalkylethoxy phosphonate, Hopkins, Ronald J. teaches the following:

TABLE 2

%	Percent of Completely Etched Geometries						Etch	10
Examples								
time	20 .mu.m	micron	15 .mu.m	4 .mu.m	3 .mu.m	2 .mu.m		
<hr/>								
LI No. 2								
	105	100	100	100	100	100	100	
none*	105	100	5	50	60	70	63	
FC-93*	105	100	96	56	60	31	96	

\*(Comparative) (*emphasis added*)

Concerning the photoresist cleaning, Hopkins, Ronald J. teaches the following:

It is a further object of our invention to provide a series of such etching solutions which after 0.2 micron filtration are essentially free of metal ions, having the same rate of etching at the same etching temperatures as prior art solutions, and which have better wetting characteristics for improved etch uniformity, and do not leave residues or adversely affect **photoresist** adhesion. (*emphasis added*)

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Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Barber, Leslie Cox (US20040029395).

Concerning the deionized water, surfactant, acetylenic alkoxyates and the 2,5,8,11-tetramethyl-6-dodecyne-5,8-diol, Barber, Leslie Cox teaches the following:

[0053] Three process solutions containing **acetylenic diol surfactants** derived from 2,4,7,9-tetramethyl-5-decyne-4,7-diol (examples 5 and 6) or 2,5,8,11-tetramethyl-6-**dodecyne-5,8-diol** (example 7) were prepared by adding 0.1 weight percent of each **surfactant** to **deionized water** under continuous stirring. The **surfactants** used in examples 5 through 7 are marketed by Air Products and Chemicals, Inc. of Allentown Pa., the assignee of the present invention, as SURFYNOL.RTM. 2502, SURFYNOL.RTM. 104, **DYNOL.RTM. 604**, respectively. (*emphasis added*)

Concerning the surfactant containing fluorine, Barber, Leslie Cox teaches the following:

3TABLE III Comparison of Foam Properties with Solutions containing other Surfactants

	Foam Height at Composition Height (cm) 6 sec (cm) 5 min (cm) 5 min (cm)	Rinse Initial Foam Height at Height at Composition Height (cm) 6 sec (cm) 5 min (cm) 5 min (cm)
Example 5	0.6	0
0	0	0
0	0	0
Fluorosurfactant	14.5	14.5
N/A	13.5	(0.1 weight %).sup.(1)
Ionic surfactant	22.0	22.0
20.0	N/A	(0.25 weight %).sup.(2)

.sup.(1)Information obtained from DuPont **ZONYL .RTM.** marketing literature. .sup.(2)Information obtained from Weil, J. K., et al., "Synthetic Detergents from Animal Fats: the Sulfonation of Tallow Alcohols", J. Am. Oil Chem. Soc. 31, p. 444-47 (1954). (*emphasis added*)

Concerning the photoresist cleaning, Barber, Leslie Cox teaches the following:

[0045] In certain preferred embodiments, the process solution is applied to a substrate having a **photoresist** coating applied thereto. The **photoresist**-coated substrate is then exposed to radiation to provide a design pattern that is imposed upon the **photoresist** coating. Depending upon whether the **photoresist** coating is positive or negative, the radiation either increases or decreased its solubility in a subsequently applied, alkaline developer solution such as a process solution containing tetramethylammonium hydroxide (TMAH). In a positive **photoresist** coating, the areas masked from radiation remain after development while the exposed areas are dissolved away. In a negative **photoresist** coating, the opposite occurs. The process solutions of the present invention may be suitable to treat substrates having either positive or negative **photoresist** coatings. After the patterned **photoresist** image is formed, the substrate is baked to harden the polymer contained within the **photoresist**. (*emphasis added*)

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Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Koehler, Richard David (US6506806).

Concerning the surfactant, Koehler, Richard David teaches the following:

Various fluorocarbon **surfactants** were added to solutions of hydrocarbon **surfactants** prepared as previously described. The surface tension of the resulting solutions were measured as described in Example 1. Table A lists the combinations of hydrocarbon **surfactants** and fluorocarbon **surfactants** for all examples. All of the ZONYL fluorocarbon **surfactants** were obtained from E. I. duPont de Nemours and Company, Wilmington, Del. The FLUORAD fluorocarbon **surfactants** were obtained from 3M Company, Minneapolis, Minn. The hydrocarbon **surfactants** were obtained from various commercial sources as previously listed. Tables 2 to 10 list the surface tension data for each of Examples 2-10. (*emphasis added*)

Concerning the surfactant containing fluorine and the 2,5,8,11-tetramethyl-6-dodecyne-5,8-diol, Koehler, Richard David teaches the following:

A mixture of ZONYL FSH, a **fluorinated surfactant**, and DYNOL 604, a hydrocarbon surfactant, was added in the amount shown in Table 12 to a proprietary floor finish from Johnson Wax Professional in Sturtevant, Wis. 53177. The surface tension was measured as in Example 1. ZONYL FSH was obtained from E. I. du Pont de Nemours and Company, Wilmington, Del. and DYNOL 604 was obtained from Air Products Corporation, Allentown, Pa. The resulting data are in Table 12. (*emphasis added*)

Concerning the acetylenic alkoxyates, Koehler, Richard David teaches the following:

The hydrocarbon surfactants suitable for use in the present invention include any that are useful for achieving a low surface tension in an aqueous system, and particularly those useful for achieving low "dynamic" surface tension. "Dynamic surface tension" is used herein to mean lowering the surface tension as a function of time. Examples of such surfactants include nonionic, anionic, cationic and amphoteric surfactants. Many are commercially available such as TRITON X-100 from Dow Chemical Corporation, Midland, Mich., an octylphenoxypolyethoxyethanol; Aerosol OT from CYTEC Industries, West Paterson, N.J., a sodium dioctyl sulfosuccinate; WITCONATE P-1059 from CK Witco Corporation, Houston, Tex., an alkaryl sulfonate isopropylamine salt; SURFADONE LP-100 from International Specialty, Wayne, N.J., an N-octyl-2-pyrarolidone; SURFYNOL 104 from Air Products and Chemicals Inc., Allentown, Pa., a tetramethyl-5-decyne-4,7-diol,2,4,7,9-; DYNOL 604 from Air Products and Chemicals Inc., Allentown, Pa., an ethoxylated **acetylenic diol** mixture;

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MERPOL SE from Stepan Company, Northfield, Ill., a nonionic surfactant (5EO adduct of tridecyl alcohol); and MERPOL SH from Stepan Company, Northfield, Ill., (the 8EO adduct of tridecyl alcohol). (*emphasis added*)

Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Lassila (US 6,313,182).

Lassila teaches EO/PO products of actelyenic diols wherein the amount of propoxylated groups is greater than or equal to 1 (see abstract).

Lassila teaches the use of these surfactants in aqueous solutions (see col. 10, lines 39-50).

Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Lassila (EP 115035 A1).

Lassila teaches EO/PO products of actelyenic diols wherein the amount of propoxylated groups is greater than or equal to 1 (see abstract).

In table 3, Lassila teaches various combinations of the surfactant with water.

Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Lassila (US 6,864,395).

Lassila teaches EO/PO products of actelyenic diols wherein the amount of propoxylated groups is greater than or equal to 1 (see abstract).

Lassila teaches various surfactants with various ratios of ethylene oxide and propylene oxide (see table 6).

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Claims 1-9, and 27-30 are rejected under 35 U.S.C. 102(e) as being anticipated by Lassila (JP 2001-215690).

Lassila teaches EO/PO products of acetylenic diols wherein the amount of propoxylated groups is greater than or equal to 1 (see abstract).

Lassila propoxylating various well-known ethoxylated acetylenic diols using 7 moles of propylene oxide and 10 moles ethylene oxide (see example 1)

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Gregory E. Webb whose telephone number is 571-272-1325. The examiner can normally be reached on 9:00-17:30 (m-f).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Douglass McGinty can be reached on (571)272-1029. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Gregory E. Webb  
Primary Examiner  
Art Unit 1751

gew